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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,319	12/04/2003	Peter J. Hopper	100-23800 (P05751)	4947

33402 7590 02/23/2005

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EXAMINER
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NHU, DAVID

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

10/728,319

Applicant(s)

HOPPER ET AL.

Examiner

David Nhu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTIONS

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Dark et al (6,563,189 B1).

**Regarding claim 1**, Dark, (see figures 1A-1F, col. 2, lines 1-67, col. 3, lines 1-44), teaches a method of processing a semiconductor material having a top surface and a bottom surface, the method comprising the steps of: forming a doped region 104 in the top surface of the semiconductor material; forming a hole 112a, 112b, 112c in the semiconductor material 110 that extends through the semiconductor material, the hole having substantially anisotropic sidewalls/spacers 116' (see figure 1C); and forming a metallic plug 116 in the hole (see figure 1C, col. 2, lines 59-67, col. 3, lines 1-8).

Regarding claims 2, 3, 4, Dark, (see figure 1D), also teaches forming a hole includes: forming a layer of masking material 118a, 118b, 118c to expose a region of the top surface of the semiconductor material 110; wet etching the region of the semiconductor material with an etchant to form the hole.

Regarding claim 5, Dark, (see figures 1D, 1E), teaches forming a first layer of material 114 on the semiconductor material 110 to line the hole 116; forming a second layer of material 116' on the first layer, the second layer being different from the first layer.

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Regarding claims 6, 7, 8, Dark, (see figures 1C, 1D), teaches the first layer of material is a barrier layer 114; forming a metallic material 118c on the second layer of material to fill up the hole 116; removing the first layer of material from the top and the bottom surfaces of the semiconductor material to form a conductive plug W.

Regarding claim 9, Dark, (see figure 1B), teaches forming a layer of insulating/dielectric material 110 on the top surface of the semiconductor material, the insulating material having a top surface; forming a first opening 112 a and second opening 112c in the layer of insulating material 110, the first opening exposing the doped region 104, the second opening exposing the conductive plug 116.

Regarding claim 10, Dark (see figure 1D), teaches forming a first contact structure 118a, 118b in the first opening to make an electrical connection with the doped region 104; forming a second contact structure 118c with the conductive plug 116.

Regarding claim 11, Dark (see figure 1E), teaches forming a layer of (metal-1)118 on the layer of insulating material 110, the first contact 118a, 118b, and the second contact 118c.

### **Conclusion**

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Dark'797, Gardner'529, Gardner'964 is cited as of interest.

4. A shortened statutory period for response to this action is set to expired 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).

5. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on

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Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.*

*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.*

*Information regarding the status of an application may be obtained from the patent application information retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).*

David Nhu



February 17, 2005

